

RESULTS OF EXPERIMENTS

AT

FORT VERMILION, ALTA.

Compiled from the Annual Detailed Reports
of

ROBERT JONES, Superintendent

DOMINION EXPERIMENTAL FARMS

BULLETIN No. 6—NEW SERIES

DOMINION OF CANADA

DEPARTMENT OF AGRICULTURE

Published by direction of the Hon. W. R. Motherwell, Minister of Agriculture, Ottawa, 1922

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OTTAWA
F. A. ACLAND
PRINTER TO THE KING'S MOST EXCELLENT MAJESTY
1922

RESULTS OF EXPERIMENTS AT FORT VERMILION, ALBERTA

The settlement of Fort Vermilion lies on the banks of the Peace river, some 350 miles north of Edmonton in 58° 24' north latitude, 116° west longitude and at an elevation of 950 feet above sea-level.

The phases of its history are essentially those through which the greatest portion of our country has at some time passed or, in its more outlying regions, is now passing. First the coming of the fur-trader, with his merchandise for barter and his fort for protection. Next, the Indian Mission, with its church and its school, and then, the beginning of the final phase, the coming of the hardy pioneer settler, clearing a small holding in the shadow of the fort. From then on, rapidity of settlement is regulated by the agricultural possibilities of the district and its transportation facilities.

In the earlier settled parts of Western Canada, the possibilities and methods of crop production had largely to be worked out by the settler himself at the cost of many a mistake and failure. Settlers in the Peace River district are more fortunate. The Hudson Bay Company at the Fort had long grown successfully garden produce for their employees and at the Mission, founded in 1880, some grain had also been grown. It was not until 1908, however, that the first Director of Dominion Experimental Farms, Dr. Wm. Saunders, entered into an agreement with Mr. Robert Jones, an early settler at Fort Vermilion, whereby the latter undertook to carry on some experimental work with cereals, fruits and vegetables, with a view to ascertaining the varieties best suited to the district. Five acres of land were rented for the purpose. Under succeeding directors of the Farms system, this work has been continued and as the vast agricultural possibilities of the Peace River district became more apparent, it has expanded, until at present twenty-five acres of Mr. Jones' farm are devoted to experimental work with cereals, forage plants, vegetables and fruits, while the remainder of his holdings furnish an excellent demonstration of the application, in farm practice, of the experimental results obtained.

Until recent years, settlement in the Fort Vermilion district has been slow and production hampered, owing to lack of transportation facilities. Until the railway reached Peace River crossing it took a month to make the trip from Fort Vermilion to Edmonton; it can now be done comfortably in five days. From 1917 on, settlement has been more rapid.

The surface of the district is level and in parts gently rolling. The soil is a rich, deep loam, on a sandy clay subsoil. The district round Fort Vermilion is best adapted to mixed farming on farms of moderate size; in the more outlying parts there are very large sections that are well grassed and afford ample feeding grounds and winter feed for extensive stock raising. Building logs, fencing material and firewood are found within easy distance of practically any location. Most of the land requires but little clearing and is easily broken for crop. Good water is obtainable in the Fort Vermilion section at from 15 to 40 feet. Schools and churches are located wherever settlement warrants.

The prospective settler in this district, then, has had many of his difficulties solved for him. He is not facing the primitive or the unknown. He has every opportunity for success, and has, as a guide to his farming operations, the vast amount of data gathered at the Fort Vermilion Substation, the personal interest and advice of Mr. Jones, its superintendent, and the example of the excellent farms of earlier settlers.

The data given in this bulletin are a compilation from the carefully prepared detailed reports made by Mr. Jones each year since 1908. During that period there

has never been a complete crop failure in the Peace River district. Mr. Jones states a crop failure there "is unknown." Following the compilation of experimental results will be found the weather records taken at the Substation from July, 1908, until the close of December, 1921, together with a record of the average daily hours of bright sunshine. It is important to remember, in this connection, that the average daily sunshine is greatly reduced by cloudy days. In summer the day from sunrise to sunset is some eighteen hours long and the "night" itself is only a twilight. It is these long days of summer which permit of the almost miraculous growth of vegetation and its coming to maturity in the short season.

This bulletin would be incomplete did it not make special acknowledgment of Robert Jones' services, not only to the Dominion Experimental Farms, but, in the highest sense, to the Dominion of Canada. Men such as he who blaze the way into new and untried regions and who extend the welcome hand of their experience to those who follow, render a service which is beyond pecuniary reward. Perhaps some day, when the sword is finally beaten into the ploughshare, and some writer, with the new perspective, pens a revised "Makers of Canada," such men will come into their own.

HORTICUTURAL EXPERIMENTS

Since 1908, experiments in horticulture have been conducted at the Sub-station, Fort Vermilion, Alta., and from these experiments it is now possible to give the prospective settler a very good idea of which vegetables, fruits, flowers, and ornamental trees and shrubs he can grow successfully, and the time when he may expect such plants to be ready for the table, or harvested, and when certain flowers are in bloom.

VEGETABLES

The vegetable garden at the Fort Vermilion Station has, for many years, been a source of wonder to the travellers who pass through this part of the Peace River district. Not only are vegetables seen to be about as far advanced as they would be at the same date in Eastern Canada, but many of them grow with a surprising luxuriance.

Owing to the relatively short summer season, it is important to sow the seed as early as possible in order to take full advantage of the long summer days which are, to a great extent, responsible for the rapid growth made by many kinds of vegetables. The ground usually thaws out and dries off sufficiently to make it possible to begin seeding during the first week of May, and that is the time when such hardy vegetables as beets, carrots, onions, lettuce, radish, parsnips, spinach and turnips are sown. Potatoes are usually planted early in May, although sometimes, as with those vegetables just mentioned, planting has taken place in April. The following dates of planting potatoes since 1909 are of interest and show how early it is possible to get on the land: 1909, May 18; 1910, May 2; 1911, May 4; 1912, May 1; 1913, April 24; 1914, April 30; 1915, April 16; 1916, May 1; 1917, May 9; 1918, May 7; 1919, April 26; 1920, May 6; 1921, April 30. The more tender vegetables, such as beans and corn, are planted during the first and second weeks of May, as it has been found preferable to take chances of frost rather than to delay planting.

As in other parts of Canada, it is necessary to start certain kinds of vegetables in hot-beds in order to ensure success, and such sorts as cabbage and cauliflower are set out in the open during the third and fourth weeks of May. Tomatoes are planted in the open early in June.

Asparagus.—Asparagus has been under test at Fort Vermilion for ten years, and has been found to be a very satisfactory vegetable there. The dates when it has been ready for use each year since 1913 are as follows: 1913, May 26; 1914, May 22; 1915, May 20; 1916, May 20; 1917, May 19; 1918, May 28; 1919, June 2; 1920, June 5; 1921, June 10.

Some of the best varieties are Argenteuil, Palmetto, and Conover's Colossal.

Beans.—The bean is a very tender vegetable and very little frost injures it, hence it is not so certain a crop at Fort Vermilion as are some others. Since 1918, when the first test was made, there have been unfavourable seasons for beans in 1910, 1915, 1918, and 1920, and no green beans were produced in those years, but in the remaining years when they were under test the dates when they were planted and ready for use are as follows: 1909, May 17, August 1; 1911, ready first week of August; 1912, May 2, August 17; 1913, ready July 28; 1914, May 6, July 21; 1916, May 15, July 22; 1917, May 9, July 29; 1919, May 12, August 2; 1920, July 23; 1921, July 27. As the broad beans or horse beans stand several degrees of frost they are well worth growing, especially for years when the other beans fail. In 1918 broad Windsor beans were ready for use on August 8; in 1919, on August 9; in 1920, on August 2; and in 1921, on July 29.

The earliest varieties of beans, such as Golden Wax, Wardwell Kidney Wax, and Stringless Green Pod, are among the most satisfactory.

Beet.—The beet succeeds very well in the Peace River district, and good results have been obtained at Fort Vermilion. As it is ready for use early in the summer, it is a vegetable which every settler should plant. The dates when beets have been ready for use are: 1911, July 25; 1912, July 15; 1913, July 8; 1914, July 16; 1915, July 29; 1916, July 15; 1917, July 17; 1918, July 30; 1919, Aug. 16; 1920, July 17; 1921, July 10.

The best all round variety is the Detroit Dark Red, though Crosby Egyptian is an old reliable early sort.

Brussels Sprouts.—The season is rather short for Brussels sprouts, yet if planted early they will develop well in a favourable season. One of the best varieties is the Improved Dwarf.



Cabbage and Cauliflower on the Station

Cabbage.—The cabbage is one of the most reliable vegetables at Fort Vermilion, and from 1909 to 1921 there has been no failure. The first date in each year when

this vegetable has been ready for use is: 1909, July 30; 1910, July 12; 1911, June 30; 1912, July 29; 1913, Sept. 1. (The long drought in this year checked the development); 1914, July 28; 1915, July 20; 1916, July 8; 1917, July 17; 1918, July 20; 1919, July 31; 1920, July 20; 1921, July 26. In some seasons the cut-worms were very troublesome, but these can be controlled by the free use of the poison bran mash.

The most satisfactory varieties are the Early Paris Market for extra early, and the Early Jersey Wakefield and Copenhagen Market.

Cauliflower.—Cauliflower has succeeded well in most years. Following are the dates when this vegetable was ready for use in all years from 1909 to 1921 except in 1916 when only late sorts were planted: 1919, ready August 1; 1910, July 15; 1911, July 18; 1912, July 10; 1913, July 19; 1914, Aug. 7; 1915, July 22; 1917, July 19; 1918, July 26; 1919, July 28; 1920, July 18; 1921, July 22.

The most satisfactory varieties are the Early Dwarf Erfurt and the Early Snowball.

Carrot.—There has been no failure in the carrot crop since consecutive experiments were started in 1909, and this vegetable succeeds well. The dates when carrots have been ready for use each year are: 1909, July 18; 1910, July 15; 1911, July 15; 1912, June 29; 1913, July 14; 1914, July 13; 1915, July 10; 1916, July 2; 1917, July 9; 1918, July 8; 1919, July 8; 1920, July 12; 1921, July 5.

For extra early use, the Early Scarlet Horn is a good one, but for main crop Chantenay is one of the best varieties.

Corn.—Like other crops which are injured by light frosts, corn is not a certain crop every year. Since 1909 garden corn has reached the stage when it was ready to eat off the cob on the following dates: 1909, August 24; 1913, August 4; 1914, August 12; 1916, August 15; 1917, August 29; 1919, August 29; 1920, August 18. In 1920 Howe's Bantam was ripe by September 16.

The varieties of sweet corn recommended for planting are Pickaninny, Sweet Squaw, Sweet Kloodman, and Early Malcolm. Of these, the Pickaninny is the earliest and is the surest to reach condition for eating. Of the early varieties which are not sweet, Howe's Bantam and White Squaw are two of the most reliable. These may ripen seed when the sweet corns will not.

Celery.—Celery has been grown annually at Fort Vermilion since 1912, and does well there. It must, however, be started early in the spring to ensure getting well developed plants as it grows slowly at first. The dates when it has been considered ready for use each year are: 1912, August 29; 1913, August 6; 1914, August 15; 1915, August 4; 1916, August 21; 1917, August 18; 1918, August 26; 1919, August 15; 1920, August 19; 1921, August 17.

The most reliable variety is the White Plume, as it develops more rapidly than others. The Golden Self-Blanching should also be tried as it is a good sort and is early also.

Citron.—The season of warm weather is rather short for the citron, but it has been tested since 1913, and in 1914, 1916, and 1917 reached a fair size.

Cucumber.—In order to be sure of having cucumbers every year it is desirable to have a few plants in a hot-bed or cold frame where they are protected from spring frosts. Since 1910 crops of cucumbers were obtained in the following years: They did well in 1911 though the date when ready for use is not recorded. They were ready for use in 1913, August 1; 1914, August 10, but were ready for pickling on July 30; 1916, August 1; 1917, August 9; 1921, August 3.

Kohl Rabi.—The kohl rabi has only been grown in recent years, but, like cabbage, has proved a reliable vegetable. It was ready for use 1919, August 15; 1920, July 28; 1921, August 18.

Lettuce.—This is a very satisfactory vegetable at Fort Vermilion, and has been recorded as being ready for use on the following dates since consecutive tests were

started: 1909, June 20; 1910, June 1; 1911, June 6; 1912, May 28; 1913, May 31; 1914, May 29; 1915, May 21; 1916, June 8; 1917, May 24; 1918, June 12; 1919, June 12; 1920, June 12; 1921, May 28.

Among the varieties that succeed best are Grand Rapids, a loose leaf variety, for early use, and Dreer's All Heart, Salamander, and Iceberg, head varieties, for use during the summer.

Parsley.—Parsley has succeeded very well, the dates when it has been marked ready for use being, 1914, June 3; 1915, July 14; 1917, July 10; 1919, June 19; 1920, did not germinate; 1921, June 1.

Melons.—The season of warm weather is a little too short for melons, although if muskmelon plants are kept in hot-beds, it may be possible to mature fruit. Since 1910, when melons were first tested at Fort Vermilion Station, none has ripened.

Onion.—The onion succeeds well at Fort Vermilion, but it is important to get them started very early. For this reason sets or transplanted plants are most desirable, in order to ensure the bulbs reaching maturity before the cool weather of early autumn, when, if the plants are still growing, they are likely to run to thicknecks. Green onions are recorded as being ready for use in 1916, June 20; 1917, July 1; 1918, July 18; 1919, July 8; 1920, June 30; 1921, June 27. One of the best crops of onions produced was from the Red Wethersfield in 1920, which yielded at the rate of 221 bushels per acre.

The most reliable varieties, taking one year with another, are Early Flat Red, Large Red Wethersfield, and White Barletta.

Parsnip.—The parsnip succeeds well at Fort Vermilion. Being a very hardy vegetable and not injured by light frosts, it is a very reliable crop. In recent years the dates when it has been recorded as being ready for use are: 1917, July 24; 1918, August 2; 1919, August 22; 1920, August 2; 1921, July 8.

Peas.—Peas have been tested regularly every year since 1909, and only in one year, 1910, when a heavy frost injured them on June 28, have they been a failure. The dates when they have been ready for use are: 1909, July 19; 1911, July 19; 1912, July 1; 1913, July 7; 1914, July 6; 1915, July 16; 1916, July 2; 1917, July 16; 1918, July 8; 1919, July 19; 1920, June 21; 1921, July 6.

Some of the best varieties have proved to be Thos. Laxton, Gregory Surprise, English Wonder, Gradus and Stratagem. The Henderson First of All is very early and yields well but is a smooth pea.

POTATOES

The potato succeeds well at Fort Vermilion, and many excellent crops have been obtained since regular testing began in 1909. In no year since that time has there been a failure in the crop. Some of the yields per acre reported since 1909 are: 1912, over 200 bushels per acre; 1913, between 300 and 400 bushels per acre; 1914, best yield 441 bushels per acre, and from a large field plot of Early Rose, 320 bushels per acre; 1916, best yield at the rate of 450 bushels per acre; 1917, best yield was from Rochester Rose at the rate of 505 bushels per acre; 1919, Early Rose yielded at the rate of 689 bushels per acre on the best plot, and a one-half-acre plot of the same variety yielded 440 bushels per acre. The poorest crop from 1909 to 1921 was in 1918, when the yield was 130 bushels per acre, but that year the plants were frozen on June 13, June 27, July 1, and July 18. The usual time for planting potatoes at Fort Vermilion is from the middle of April to the end of the first week of May. Potatoes have not been planted after May 10 since 1909. Although spring frosts sometimes injure the vines, they usually recover. Because of the early autumn frosts it is desirable to get the potatoes planted early.

The following tables show the results from potato tests in 1919, 1920, and 1921:

POTATOES—1919

Planted in uniform test plots of one-sixteenth acre each.

Grain on land in 1918.

Twenty wagon loads of well rotted barnyard manure per acre applied autumn of 1918, after which the land was deeply ploughed.

Land thoroughly disced spring of 1919 and then smoothed over with the drag harrow.

Drills ploughed out very deeply three feet apart with walking plough and left for a few days before planting to let soil warm up.

Sets cut to a good size with three eyes to a set.

It has been found desirable to have sets large because if plants are frozen, which is often the case, there is sufficient vitality in the set to give the plants a new start.

The sets were planted 12 inches apart in drills, and after planting were covered lightly with hoes.

At frequent intervals the harrow was dragged over the plots until the drill was filled up.

When plants were up sufficiently to see the rows, the horse cultivator was started. The plots were cultivated three times with the horse cultivator and hand hoed once. As the potatoes were planted so deeply, very little hilling was needed.

As the ground remained cold a long time, the potatoes were slow in getting a start and all danger of frost was past before they were above ground, but as the land warmed up the potatoes made very rapid growth, and, with the abundant moisture of 1919, one of the heaviest crops obtained at this station was harvested. The tubers were large and there was no scab nor blight observed.

POTATOES—RESULTS OF TESTS, 1921

Name of Variety	Date of Planting	Date fit for use	Date dug	Total Yield per acre	Yield per acre Marketable	Yield per acre Unmarketable	Remarks
Early Rose.....	April 30	July 29	Sept. 23	bush. lb. 689 4	bush. lb. 535 ..	bush. lb. 154 4	Size medium
King Edward.....	" 30	Aug. 2	" 22	605 44	485 ..	120 44	"
Carman No. 1....	" 29	" 18	" 23	524 ..	484 ..	40 ..	Size very large, improves in quality when stored.
Rochester Rose..	" 26	July 26	" 22	518 40	453 30	62 10	Very large and uniform.
Gold Coin.....	" 28	Aug. 12	" 23	405 52	370 ..	35 52	Quite large, uniform in size.
Irish Cobbler....	" 29	" 8	" 23	388 ..	363 ..	25 ..	Large and very uniform in size.

A field of $\frac{1}{2}$ acre Early Rose was planted on May 6. These were fit for use on July 31 and were dug on September 22, and gave a yield of 440 bushels per acre of very fair potatoes, uniform in size and clean.

POTATOES—1920

Name of Variety	Date of Planting	Date fit for use	Date dug	Total Yield per acre	Yield per acre Marketable	Yield per acre Unmarketable	Remarks
Rochester Rose..	May 6	July 28	Sept. 20	528 ..	448 ..	80 ..	Size medium.
Carman No. 1....	" 6	Aug. 14	" 21	496 ..	400 ..	96 ..	Size very large.
Early Rose.....	" 7	July 31	" 20	480 ..	380 ..	100 ..	A large percentage of small ones.
King Edward....	" 7	Aug. 2	" 22	464 ..	374 ..	90 ..	Large.
Gold Coin.....	" 6	" 4	" 21	432 ..	342 ..	90 ..	Size medium.
Irish Cobbler....	" 6	" 10	" 21	416 ..	334 ..	82 ..	Size large.

Quarter-acre plots of Early Rose and King Edward yielded respectively 360 and 515 bushels per acre, and a half-acre of Rochester Rose yielded 495 bushels per acre. All potatoes were free from disease and tops were very rank.

Name of Variety	Date of Planting	Date fit for use	Date dug	Total Yield per acre	Yield per acre Marketable	Yield per acre Unmarketable	Remarks
Rochester Rose..	April 30	July 18	Sept. 15	420 40	355 ..	85 40	Size large, colour pink.
Carman No. 1....	" 30	" 30	" 15	394 ..	334 ..	60 ..	Size very large, colour white.
Early Rose.....	" 30	" 23	" 15	381 40	300 ..	81 40	Size medium large, colour pink.
King Edward....	May 3	" 29	" 16	361 20	300 21	61 ..	Size fairly large, colour russet.
Gold Coin.....	" 3	" 28	" 15	336 ..	286 ..	50 ..	Size medium, colour white.
Irish Cobbler....	April 30	" 26	" 16	330 ..	285 ..	45 ..	Size medium, colour white.

The above were planted in one-eighth-acre plots. Following are results from one-half-acre plots, planted May 5: Rochester Rose, yield per acre, 389 bushels; tubers were of good size. King Edward, yield per acre, 401 bushels; tubers were very large.

Pumpkins.—As pumpkins are injured by light frosts, mature specimens are not obtained every year, but since 1914 they have been tested regularly, and are reported as being mature in 1914, September 8; 1916, August 14; 1917, August, 18; 1919, September 1; 1921, August 17.

The Connecticut Field and Sugar are two of the best.



Squash and Pumpkins

Radish.—The radish is one of the most reliable crops, and since 1909 it has been tested regularly every year, and has been ready for use on the following dates: 1909, June 19; 1910, May 25; 1911, June 8; 1912, May 30; 1913, June 5; 1914, June 1; 1915, May 27; 1916, May 26; 1917, June 6; 1918, killed by frost June 1; 1919, May 22; 1920, June 9; 1921, June 5.

Scarlet White Tipped Turnip radish is one of the best, but other sorts do well.

Rhubarb.—Rhubarb succeeds very well in the Peace River district, and has given good results at the Fort Vermilion station. After a long winter it is one of the most appetizing vegetables, and, being ready for use so early in the season, is particularly welcome. As it is so easily grown, it should be in every settler's garden. The dates when it has been ready for use are as follows: 1911, June 6; 1912, May 27; 1913, May 22; 1914, May 20; 1915, May 18; 1916, May 23; 1917, May 22; 1918, May 30; 1919, May 30; 1920, June 2; 1921, June 1.

Victoria and Linnaeus are two of the best sorts.

Salsify.—This vegetable can be grown quite successfully and has been reported as being ready for use, 1919, July 30; 1920, June 28; 1921, July 1.

Mammoth Sandwich Island is a good sort.

Spinach.—Spinach is a very hardy vegetable, and, as it is ready for use early in the season, is a desirable plant to grow. It was in condition for the table on the following dates: 1912, June 1; 1916, June 8; 1917, June 16; 1918, June 27 (they were checked by spring frosts that year); 1920, June 7; 1921, June 2.

Victoria is the best variety.

Squash.—Squash, like pumpkins and melons, are killed by light frosts, hence are not quite so reliable as some of the hardier vegetables, but the following years with dates when squash became ready for use, show that in a fair proportion of seasons they mature: 1912, July 25; 1913, August 21; 1914, August 3; 1916, August 2; 1917, August 16; 1919, August 27; 1921, August 17.

Two of the most reliable varieties are Long White Bush Marrow and English Vegetable Marrow.

Tomato.—The warm season is not quite long enough at Fort Vermilion for the development of a large crop of ripe tomatoes, and, as the tomato is injured by light frosts, it is one of the most uncertain of the commoner vegetables. To be grown successfully, plants should be started early, kept in hot-beds until danger of frost should be over and then grown on single stems tied to stakes. If they can be planted with a south or southwest exposure with something behind, such as a fence, to reflect the heat, it will assist in ripening them. The following records since 1908 show how the tomatoes succeeded in each year and will give a good idea of how often one may count on getting much ripe fruit: 1908, almost ripe August 29; 1909, fruit almost ripened; 1910, heavy frost June 28 destroyed plants; 1911, almost ripe; 1912, cut down by frost July 14; 1913, some were fully ripe September 1; 1914, a large proportion ripe this year, the first being on September 6; 1915, killed by frost June 14; 1916, ripe fruit August 31; 1917, completely cut down by frost June 1; 1918, plants killed by frost June 2; 1919, fruit beginning to colour September 3 when plants killed by frost; 1920, plants frozen on June 1, and June 6 and 7 none left; 1921, the best year since 1908, fruit ripe on August 12. Best variety Alacrity.

Turnip.—The turnip succeeds well in the Peace River district, and is one of those vegetables which will stand a few degrees of frost. Following are the dates when the early varieties have been recorded ready for use: 1912, June 19; 1913, July 8; 1914, July 23 (insects destroyed the first sowing); 1915, July 4; 1917, July 5; 1918, July 16; 1919, July 24; 1920, July 15; 1921, July 8.

Extra Early Milan and Snowball are two good varieties.

FRUITS

The Peace River district is well supplied with wild fruits which usually furnish the settler with an abundant supply for his household. Among those which may be mentioned are the strawberry, raspberry, currant, gooseberry, cranberry, blueberry, and Saskatoon (*Amelanchier*). Cultivated varieties of fruits have been tested at the Fort Vermilion Station and good results have been obtained.

Strawberries.—Among the cultivated varieties of strawberries, the Senator Dunlap, Beder Wood, and World's Wonder have been perhaps the most satisfactory. The fruit ripens in July. The everbearing strawberries are, however, very promising for this district because, if the early bloom is killed by spring frosts, they will produce a large amount of fruit later on, whereas the other sorts produce little or nothing if the first flowers are killed. Among the best of the everbearing sorts are Americus, Progressive and Superb.

Currants.—The currant has given good crops at Fort Vermilion. The red varieties which have given best results are Simcoe King, Greenfield, Long Bunch Holland, and Red Dutch. Among black varieties, Climax, Topsy, Eclipse, Magnus and Kerry have proved among the most productive. Currants ripen during the latter part of July, and the fruit remains in condition well into August. The bushes do not need any protection in winter.

Raspberries.—Some of the hardiest varieties of red raspberries are Sunbeam, King and Herbert. The Heebner has also done well at Fort Vermilion, and Brighton, an early variety, is promising. Most of the crop of raspberries ripens during the month of August.

Gooseberries.—The wood of the bushes of cultivated varieties of gooseberries kills back in most winters and this fruit has not given good results. Houghton is one of the hardiest varieties and, if protected with soil in the winter, will do better than when unprotected.

Plums.—So far the plum has not been a success at Fort Vermilion, but there may yet be found hardy forms which will bear fruit regularly, such, for instance, as hybrids with the sand cherry as one parent. In 1907 trees of Cheney, Aitkin, Odegard, Bixby and Mankato plums were sent to Fort Vermilion and also some unnamed seedlings. The Cheney plum bloomed in 1915, but frost later destroyed the prospect of fruit, and since that time none of these varieties has done well, the severe winters of 1915-16 and 1916-17 being very hard on them.

Apples.—The apple has been well tested at Fort Vermilion, but so far nothing has been found to withstand the very severe winters which sometimes occur there, but it is expected that the hardiest forms of the Siberian Crab apple, *Pyrus baccata*, will be sufficiently hardy, so far as the tree is concerned, but spring frosts will always make the fruiting of tree fruits very uncertain.

In 1907 seedlings of seven varieties of Russian apples were sent to Fort Vermilion and the following ten varieties of crosses between *Pyrus baccata* and the apple: Albert, Charles, Eve, Golden, Magnus, Marquis, Pioneer, Robin, Tony, and Silvia; the latter were fairly promising until the winter of 1915-16, when they were badly injured, and the very severe winter of 1916-17 almost destroyed them. In the year 1916, the Charles and Silvia bore a little fruit but were later killed.

One hundred and seventy trees had been set out in 1914, of which 143 were alive in 1916, but the winter of 1916-17 was very hard upon these. More trees of some of the hardiest varieties are again under test in the hope that something sufficiently hardy will be found.

FLOWERS

The flower garden at Fort Vermilion has been a very attractive part of the Station for a long time, and has been the means of cheering many a traveller far from home. After seeing the profusion of bloom which is produced here, few doubt the great possibilities there are in this country for the making of gardens as useful and beautiful as those which can be found anywhere else in Canada.

It is scarcely necessary to give in detail a list of the flowers that can be grown successfully here as most of the varieties which are grown in the more southerly parts of Canada do well. Seed of the tenderer kinds of flowers is sown in hot-beds early in April and transplanted to the open during the latter part of May and beginning of June. Seeds of the hardier flowers are sown in the open.



In the Station Flower Garden and Bush Fruit Plantation

Some of the annual flowers which succeed especially well at Fort Vermilion are: Candytuft, poppies, petunia, eschscholzia and zinnias, beginning to bloom in June; antirrhinum, phlox drummondii, stocks, verbenas and sweet peas, beginning to bloom in July; asters, beginning to bloom in August. Many other kinds have been tested and do well, pansies being particularly satisfactory.

Among herbaceous perennials, some of the most satisfactory have been Scarlet Lychnis (*Lychnis chalcedonica*); Gas Plant (*Dictamnus Fraxinella*); Larkspur (*Delphinium*); Columbine (*Aquilegia*); *Serastium tomentosum*; Pæony; Gaillardia; Dianthus; Arabis; Achillea, the Pearl.

ORNAMENTAL SHRUBS AND TREES

A considerable number of species of ornamental shrubs have been tested at Fort Vermilion, among the most satisfactory being the various species of Caragana, such as the Siberian Pea Tree (*Caragana aborescens*), *C. frutescens*, *C. grandiflora*, *C. pygmaea*, and *C. tragacanthoides*. These bloom in the month of May. The Bush or Tartarian honeysuckles are very satisfactory and bloom during the latter part of May and early June. Lilacs also succeed here, some of the best of the named varieties having bloomed such as Chas. Joly, Chas. X, Congo, and Emile Lemoine. They are in flower during the latter part of May and early in June. The Chinese or

Himalayan lilac, *Syringa villosa*, does particularly well. The Japanese Tree lilac is also succeeding. Various species of spiræa bloom well, among the best being the Garland spiræa (*Spiræa arguta*), *S. Billardii*, and *S. Sorbifolia*.



Part of the Shrubs and Grain Plots

The Peace River district is noted for its wild roses, and some of the hardier introduced roses have done well at Fort Vermilion, including the Japanese Rose, *Rosa rugosa*.

Among the trees which have done well are the European Cut-leaved birch, Box Elder or Manitoba maple, Tartarian maple and Narrow-leaved poplar.

EXPERIMENTS WITH CEREALS

Previous to the season of 1909, many of the common cereal grains had been grown at Fort Vermilion, Alta., but it was not until that year that regular variety plots were started at the sub-station owing to the small amount of land under experiments. In the spring of 1909, plots were laid out for cereal purposes and since that time about 60 different varieties of cereal grains have been tested, only the most promising or recently introduced varieties still being maintained in the plots.

It is well known that early-maturing varieties of cereals will not yield as highly as the varieties that need a longer season for full maturity. This fact is again borne out from all the results at this Station in the north. But, it must always be clearly borne in mind that early maturity is essential in districts where late spring frosts or early fall frosts are apt to occur.

WHEATS

Since the introduction of variety test plots in 1909, seventeen varieties of wheat have been tested. At the present time seven varieties are under test. Five of these have been grown for six or more years, in plots. The average results of these varieties for six years are given below:—

WHEATS. (SIX-YEAR AVERAGES.)

	Days to mature	Length of straw	Strength of straw on scale of 10 points	Yield per acre	Weight per measured bushel
				Bush. Lb.	
Bishop.....	113	47	8.2	58 40	64.0
Huron.....	115	46	9.2	56 30	64.8
Red Fife.....	122	49	7.3	55 25	62.7
Marquis.....	116	46	8.7	52 35	64.1
Prelude.....	100	42	9.3	41 50	64.9

Bishop Ottawa 8 is a variety with short awns, smooth chaff and yellow kernels. It stands at the head of the list for yield, but, owing to its yellow kernel and the fact that it produces a flour of only medium baking strength, it cannot be recommended, where other red-kernelled, good-milling wheats will mature.

Huron Ottawa 3 is a long awned variety with smooth, red chaff and hard, red kernels that produce a flour with a yellow coloration, of fair baking strength. On the whole, this wheat is probably preferable to Bishop.

Red Fife Ottawa 17.—An awnless, white-chaffed variety, with hard, red kernels, producing a flour of excellent baking strength. As Red Fife ripens somewhat too late for this district, it cannot be recommended.



Corn and Wheat

Marquis Ottawa 15.—An excellent variety, that is awnless, with white chaff and a hard, red kernel, giving flour of A. 1. quality. The chaff holding the grain very tightly makes this variety less subject to shattering from winds than most varieties. Marquis wheat ripens at a time that may be considered reasonably safe in the average season.

Prelude Ottawa 135.—A very early, awned variety with downy chaff, and hard, red kernels, producing a good quality flour of good colour. The main disadvantages of Prelude are its tendency to shatter in the field and its long awn; this tendency to shatter would probably partly account for its low yield.

Ruby Ottawa 623.—An early, awnless variety with white chaff and a hard, red kernel, producing a flour of good colour and baking strength. It is less liable to shattering than Prelude. Ruby has only been tested for 4 years; in this period it gave an average yield of 39 bushels 38 pounds, whereas for the same period Prelude yielded 38 bushels 15 pounds.

OATS

Twelve varieties of oats have been tested in plots. Six of these varieties are still under test, three of which are older varieties that have been under test for six or more years, the average results of which are given herewith.

OATS. (SIX-YEAR AVERAGES.)

	Days to mature	Length of straw	Strength of straw on scale of 10 points	Yield per acre	Weight per measured bushel
				Bush. Lb.	
Banner.....	103	50	9.0	88 33	38.6
Daubeney.....	92	44	8.2	66 31	34.9
Eighty Day.....	89	43	8.3	62 2	33.1

Banner Ottawa 49 is a white, branching oat with a plump kernel. Banner may be grown where an early oat is not essential. It is low in percentage of hull, with a good weight per measured bushel. It is the best of the later maturing varieties.

Daubeney Ottawa 47, an early oat that is recommended in preference to Eighty Day, which it out-yields. It has a higher weight per measured bushel and lower percentage of hull. It is a white oat with a branchnig habit, the kernel being long and slender with a thin hull.

Eighty Day Ottawa 42.—An early oat, very similar to Daubeney, yielding less and with a lower weight per measured bushel.

Liberty Ottawa 480 is a hulless variety of oat that has only been under test for three years. From present indications it gives every prospect of ripening two or three days before Banner, with an average yield of about 34 bushels per acre, all of which is "meat", as the kernel threshes free from the hull. It is an excellent oat for home grinding as oatmeal for human consumption, or for feed for poultry or young live stock.

BARLEY

Twelve varieties of barley have been tested at this Station; seven of these varieties are still under test. The average results for six years are reported herewith, of the varieties that have been grown for six or more years:—

BARLEY (SIX-YEAR AVERAGES.)

	Days to mature	Length of straw	Strength of straw on scale of 10 points	Yield per acre	Weight per measured bushel
				Bush. Lb.	
Manchurian.....	90	44	8.0	60 40	48.1
Champion.....	89	46	7.8	55 15	44.7
Success.....	88	45	7.5	53 36	45.5
Hulless White.....	92	41	6.7	51 42	60.9

Manchurian Ottawa 50 is a six-rowed, bearded variety of barley which is inclined to shatter a little too easily in the field as compared with O.A.C. 21, which has only been under test for three years. From experience elsewhere, it will probably be found that O.A.C. 21 will be more suited to the Fort Vermilion district than Manchurian.

Champion is a hooded (or beardless) variety, yielding less than Manchurian (or O.A.C. 21) and should only be grown where beardedness is objectionable.

Success is a low yielding variety that is hooded and somewhat weak in straw. As a rule it will be found that the hooded varieties are lower in weight per measured bushel, owing to the difficulty of removing the hood in threshing.



Barley Plots at Harvest, Fort Vermilion

Hulless White is a six-row, hooded (or beardless), hulless variety, giving a fair yield. Owing to its quite weak straw it cannot be recommended for general use, although it has its place where a hulless variety is required.

Other barleys that are being tested but only recently introduced in plots are *Albert* and *Duckbill*.

Albert is an early, six-rowed variety, ripening in about 84 days, and may be grown where a short season variety is necessary, although it yields less than Manchurian.

Duckbill, a two-rowed variety that matures somewhat later than Manchurian, ripening at about the same time as Banner oats. It is a good yielder.

PEAS

Of the varieties that have been tested, all of them being still under test, only two have been tested for seven years. The others are new and have only been tested for two years. The average results of the two tested for seven years are herewith reported on:

PEAS. (SEVEN-YEAR AVERAGES.)

	Days to mature	Length of Vine	Yield per acre	Weight per measured bushel
			Bush. Lb.	
Arthur.....	110	59	35 52	65.6
Prussian Blue.....	114	61	34 20	64.8

The *Arthur* pea is a somewhat earlier pea than Prussian Blue. *Arthur* is a white (or yellow) pea of medium size, whereas the Prussian Blue is a blue pea of about the same size.



Spring Rye and Oats. Field Peas in Foreground.

Empire and *Alberly*, two varieties procured from Prof. Cutler at Edmonton are both blue peas, giving every prospect of good results from the two years tested.

MISCELLANEOUS GRAINS

Spring and Fall Rye.—On a five-year average, Common Spring rye has yielded 48 bushels 42 pounds, taking 105 days to mature, whereas Fall rye, which suffers a little from winter-killing, on a four-year average yielded 41 bushels 7 pounds, taking 349 days to mature, having been seeded, on an average, in the second or third week in August.

Buckwheat has been grown with but little success, as the crop is not reliable in the average season, being injured or completely killed by frosts in June.

Flax.—It would appear from the results obtained that, as an average, flax would not be a paying crop in the north, as in most years a late spring frost, or an early fall frost damages the crop to such an extent that the germinability of the seed is ruined, although good crops of straw have been harvested.

EXPERIMENTS WITH FORAGE CROPS

Ever since the Fort Vermilion station was instituted, forage plants have been grown experimentally but the limited acreage available for experiments, together with the northern location of the station, have of necessity prevented extensive investigations along forage plant lines. The experiments carried out so far allow, however, of a few conclusions being drawn in respect to the merits of a number of varieties tested and, on the strength of experience gained so far, a few of the results with various forage plants are herewith presented.

FIELD ROOTS

The first variety tests with field roots, which were conducted in 1908, were quite disappointing, the crops being more or less injured by grasshoppers. Since then, however, the root experiments have been free from damaging insect pests, with the exception of 1911, when all of them were completely destroyed by cutworms, and in 1914, when the swede turnip varieties suffered from attacks of insects in the month of May.

Seeding of mangels, carrots, and sugar beets in one year, 1915, took place the last week of April, and seeding of swede turnips the first week of May but, normally, roots are sown the second week of May. Late spring frosts and early summer frosts have, so far, done no capital damage necessitating reseeding to mangels, carrots, and sugar beets. Occasionally swede turnips suffer, as happened in 1918, when the swede turnip varieties were destroyed by a frost on June 1.

Pulling of field roots generally takes place the latter part of September, giving the roots a growing season which is some four to five weeks shorter than in Eastern Canada.

Considering the comparative shortness of the season, root varieties yield, on the whole, fairly satisfactory crops. In order to obtain best results, the land should be liberally manured and otherwise well prepared the year previous to seeding to roots. When roots are following grain, the land should be fall ploughed, after the grain has been taken off, then disced and harrowed the following spring immediately before seeding. On the whole, the land should receive a treatment aiming at conserving the moisture supply as much as possible, so that the seed may have the best possible opportunity to germinate rapidly and the young plants given a good start in the early summer. Early start and rapid growth in the early part of the season are, in fact, necessary for satisfactory crops, and for this reason, it is also of particular importance that the seed used possess the greatest possible vitality.

SWEDE TURNIPS

Three varieties, viz., Perfection, Good Luck, and Hartley's Bronze Top have been grown in comparative tests since 1912. The Perfection variety leads with an average yield of 21 tons 583 pounds per acre. Good Luck is second with an average of 20 tons 1,880 pounds per acre, and Hartley's Bronze Top is a close third with an average of 20 tons 1,763 pounds per acre. Considering the comparatively short period during which the tests have been carried out, the figures obtained do not indicate any marked superiority of any of the varieties as far as yielding power is concerned. Perfection shows up a little better than the other two, but, on the other hand, the Good Luck is of a better quality, especially for table use, while the Hartley's Bronze Top has a great reputation as a particularly good keeper.

During the years 1912-17, Magnum Bonum was tested in comparison with the above-mentioned varieties, but, as it proved to produce decidedly smaller crops, it has been excluded from the variety tests since 1917. It averaged during 1912-17 18 tons 1,377 pounds, while, for the same period, the Perfection averaged 22 tons 27 pounds, the Good Luck, 21 tons 445 pounds, and the Hartley's Bronze Top 20 tons 1,053 pounds.

FALL TURNIPS

Two varieties of fall turnips have been tested during the three years, 1917-19. The varieties in question, White Globe and Yellow Aberdeen Purple Top, are quite promising for the Fort Vermilion district. Their average yield is 24 tons 137 pounds per acre, as compared with an average of 20 tons 734 pounds for the three swede varieties, Perfection, Good Luck and Hartley's Bronze Top, during the same period.

Fall turnips do not require as long a growing season as do swede turnips, and are generally sown some weeks later than the latter. They may therefore prove of particular interest to the Fort Vermilion district where the growing season is some four to five weeks shorter than in the turnip-growing districts in Eastern Canada. Fall turnips, however, do not keep as long as swede turnips and can be recommended only for fall and early winter feeding.

MANGELS

Mangels have, as far as tested, given almost as good results as swede turnips, as far as yields per acre are concerned. Three varieties, representing three main types of mangel, namely the Long Red, the Intermediate, and the Globe, have been grown in test plots since 1912. Their average yield is about one ton per acre below that of the best varieties of swede turnips, but considering their higher nutritive value, as judged from their dry-matter content, the mangels are likely to prove more than equal to swede turnips, and may become more popular than the latter, especially because they are less susceptible to late May or early June frosts which, as experience has shown, may occasionally kill the swede turnips. Besides, mangels are easier to keep through the winter than are either swede or fall turnips.

The Prize Mammoth Long Red, the Giant Yellow Intermediate, and the Yellow Globe, representing three main types of mangel, were tested during the period 1912-19, the result being that the Yellow Globe has come out number one with an average yield of 22 tons, 1,039 pounds per acre. The Yellow Intermediate is second with 20 tons, 508 pounds per acre, and the Mammoth Long Red third with 18 tons, 50 pounds per acre. The long red variety called Gate Post, which was tested during the years 1912-17, proved superior to the Mammoth Long Red, but decidedly inferior as far as yield is concerned to the Yellow Globe. In yield it was about equal to the Yellow Intermediate.

It should be emphasized, though, that a high tonnage produced by a variety of mangels does not necessarily indicate its superiority. The food value of mangel varieties depends largely on their dry-matter content, and the various varieties differ greatly in that respect. The Yellow Globe has, according to numerous analyses, a much lower feeding value, pound for pound, than the Yellow Intermediate and, although it may yield more as far as the actual weight of the crop produced is concerned, the feeding value produced per acre may be lower than the feeding value produced by the Yellow Intermediate.

This should be remembered in interpreting the figures given which, on the surface, seem to show that the Yellow Globe might be preferable to the Yellow Intermediate. In fact, judging from numerous analyses and observations, the Yellow Intermediate even should the experiments show that its yields fall below those of the Yellow Globe, may be considered preferable to the latter variety. This is especially the case with strains of Yellow Intermediate of Canadian origin which lately have been put on the market.

CARROTS

Of carrots, Improved Short White, Ontario Champion, White Belgian, Large White Vosges, and Half-Long Chantenay have been tested.

The White Belgian has produced the heaviest crops, its average yield during 1912-19 being 18 tons, 1,310 pounds per acre. During the same period Ontario Champion yielded 17 tons, 1,128 pounds per acre. Concerning the Ontario Champion, it has, as far as the records show, yielded less than the Half-Long Chantenay, the Improved Short White, and the Large White Vosges, the yields being as follows:—

		Yield per Acre	
		Average	
1912-19—			
Half-long Chantenay..	.....	19 tons	316 lb.
Ontario Champion..	.....	18 tons	1,832 "
1917-19—			
Improved Short White..	.....	16 tons	1,840 lb.
Large White Vosges..	.....	16 "	320 "
Ontario Champion..	.....	15 "	820 "

During the periods referred to the White Belgian topped the list, with:—

During 1912-19.....	20 tons	672 lb. per acre	average yield.
" 1917-19.....	17 "	573 "	" "

The White Belgian consequently has given the largest yields. It is a good feeding carrot but it has some objectionable characters, chiefly because of its shape. It is long, thin, and slender and will, in suitable soil, grow to a great depth. The harvesting of the White Belgian, therefore, is rather difficult, necessitating more labour than is the case with other varieties of carrots. Notwithstanding the high yields of the White Belgian, it would probably be more advantageous, in the Fort Vermilion district, to grow the Improved Short White, the Large White Vosges and other varieties more easy to harvest than is the White Belgian.

SUGAR BEETS

From 1909 to 1917 the varieties Vilmorin's Improved and Klein Wanzleben have been grown. The records, which are complete for the period mentioned, except for the year 1911 when the sugar beets were destroyed by cutworms, show an average yield of 16 tons, 394 pounds per acre, there being practically no difference in the average yielding records of the two varieties.

INDIAN CORN FOR ENSILAGE

Judging from results obtained with various varieties grown in small test plots, Indian corn does not seem to be able to reach the proper stage to make first-class ensilage, although, in some years, surprisingly large crops of green fodder are recorded. Thus, during the years 1913, 1914, 1916 and 1917, Longfellow produced an average of 21 tons, 1,100 pounds of green fodder per acre, attaining a maximum average height of 8 feet in 1916. During 1914, 1916, and 1917, Canada Yellow yielded, in small plots, at the average rate of a little over 20 tons to the acre, and in the years 1916-17, the Quebec Yellow produced an average of almost 21 tons. The maximum average height of the Canada Yellow was recorded in 1916, with almost 8 feet, and of Quebec Yellow, in 1917, with exactly 8 feet.

In view of the performance of the two latter varieties especially, in the corn districts in other parts of the Dominion, their yields are extremely high, and are probably due, to a large extent, to the very favourable growing conditions obtainable with small plots. Under field conditions the yields would probably be much lower.

Concerning the stage of maturity reached by the various varieties at the time of cutting which, on account of weather conditions, generally cannot be delayed beyond the middle of September, it has been observed that only occasionally does an odd variety reach the proper stage of development to make really first-class ensilage. Thus, Early Longfellow yield at the rate of 15 tons, 1,500 pounds to the acre, was "in good shape for ensilage" at time of cutting in 1916; so was also King Philip, with a yield of 10 tons, 800 pounds to the acre. The year 1916, however, was exceptionally favourable for corn on account of ample rain and continuous warm weather.

In normal years, even the earliest varieties, like Canada Yellow and Quebec Yellow, hardly reach more than the silk or early milk stage.

SUNFLOWERS FOR ENSILAGE

Although sunflowers have been successfully grown in the garden at Fort Vermilion for a number of years they were tested under field conditions for the first time in 1921, and gave very promising results. Mammoth Russian, Early Ottawa 76, and a variety obtained from Mr. G. H. Hutton were under test. All varieties made good growth and were not affected by frosts which seriously injured Indian corn. At harvest all three varieties had reached sufficient maturity to make excellent ensilage.

Mammoth Russian gave an average yield of 28 tons 613 pounds, Early Ottawa yielded 18 tons 360 pounds, whilst the seed obtained from Mr. G. H. Hutton yielded 14 tons 1,220 pounds, this low yield being due probably to the fact that this variety was planted too closely and that the ground was shared with a volunteer crop of millet.

CLOVERS AND GRASSES

ALFALFA

The first attempts to introduce alfalfa in the Fort Vermilion district were not very successful. The alfalfa, almost without exception, proved easy to start; that is to say, it produced a quite satisfactory stand the year it was sown. Some difficulty, however, was experienced in bringing it through the winters and, up to 1913, no entirely satisfactory crop had been grown at the Station, the alfalfa being always partially killed out during the winter.



Hemp on the Station

In 1913 some plots were sown of the Grimm and Ontario Variegated varieties. These came through the winter without any winter killing whatever, produced good yields in 1914 and again in 1915. Other varieties, namely: Baltic, Montana, Sand Lucerne, and so-called Hardy Northern, were sown in 1914 and yielded satisfactory crops the following two years.

After three years of success in alfalfa growing it was thought that the alfalfa problem had been solved, but the experience gained in the early spring of 1917 proved that this was not entirely the case. The Station had that year a few warm days around the middle of April, melting the snow and leaving the ground quite bare. The last week of the month it turned suddenly rather cold, the result being that the exposed alfalfa suffered badly. In fact, the plots were all so badly damaged that they were ruined and had to be ploughed up.

Alfalfa representing the variegated type as well as common alfalfa, was again sown in 1918. It succeeded in coming through the winter in fairly good condition and yielded very satisfactory crops in 1919.

Judging from experience so far, alfalfa must have every possible protection against the severe winter cold to come through in a satisfactory condition. As a good snow blanket provides the most effective protection against severe cold, it is imperative that the second cutting of the season be so timed that the fall growth will have a chance to grow tall enough to catch and hold the first snow satisfactorily. In respect to injury caused by such unfavourable climatic conditions as were experienced in the spring of 1917, it may be possible to avert it or at least to lessen it by developing varieties of a hardier type than those now available.

Concerning methods of seeding, alfalfa used to be sown broadcast up to 1918 during which year it was sown in drills 16 and 20 inches apart. Variegated and Common alfalfa were both represented in this experiment. The outcome of the experiment indicates that row seeding may be advantageously practised, especially on somewhat dry locations. In case of a dry season, row seeding may also prove more remunerative than broadcast seeding but, so far, enough data are not available to allow a definite statement to be made on this point. The plots sown in rows in 1918 yielded, the following years, an average of 4 tons 1,215 pounds per acre.

In order to obtain further data bearing on the question of the best method and rate of seeding, plots of Grimm alfalfa were sown in 1919 and 1921, broadcast, and in drills 6, 24, 30 and 36 inches apart at rates of seeding from 20 pounds to 1.67 pounds per acre.

SAINFOIN

A few experiments have been carried out with sainfoin, beginning in 1910, and repeated in 1912 and 1913. In 1911 a heavy crop was reported but the results obtained in later years have not been very encouraging. On the whole, sainfoin does not promise to be of nearly as great importance as alfalfa, in fact, it is doubtful whether it should even be listed as a crop of possible value for the Fort Vermilion district.

RED CLOVER

Red clover has been grown experimentally since 1914 and has given rather promising results every year with the exception of 1917, when the extremely unfavourable weather conditions prevailing in April proved fatal to the crop. As a contributing factor to the crop failure in that year may also be mentioned damage done the previous year to the plots by grasshoppers. All other years, however, the red clover has yielded satisfactory crops. It is easy to start and comes through normal winters in good condition. From 2 to 2½ tons of hay per acre have been recorded from one cutting. So far, two cuttings have not been realized in a season.

ALSIKE CLOVER

Alsike clover experiments were taken up in 1918 and, consequently, the available data are insufficient to allow of any safe conclusions as to the future value of the crop. It may be mentioned, though, that the alsike sown in 1918 yielded at a rate of about half a ton more hay to the acre than did the red clover grown in comparison with it.

This isolated observation should, however, not be taken as an indication of alsike possibly being superior to red clover in the Fort Vermilion district. The comparative value of the two clovers can only be ascertained some years hence when more conclusive data are available.

GRASSES

A number of perennial grasses, including Timothy, Western Rye grass, Awlless Brome grass, Orchard grass, Meadow Fescue and Red Top, have been tested for a number of years, largely to ascertain their value for hay.

The results demonstrate that Orchard grass is too tender for the climate, it being regularly winter-killed. This is quite in accord with what has been observed at other experimental stations in the northern sections of agricultural Canada, and, under the circumstances orchard grass cannot be recommended for the Fort Vermilion district. Red Top has also proved to be tender, although not to the same degree as the orchard grass. It comes through some winters, but it may, in others, be completely winter-killed. It is therefore not to be relied upon and, until hardier varieties have been found, it cannot be recommended for general use. It may, when the winter conditions are favourable, have a limited usefulness in mixtures with other grasses, particularly for low-lying land.

The other grasses mentioned come through the winters regularly without suffering from any winter-killing.

BROME GRASS, TIMOTHY, AND WESTERN RYE GRASS

Brome grass experiments were started in 1909 and have been continued ever since, particularly as the grass has given results strongly indicating that it has a place as a valuable hay grass in the Fort Vermilion district. In the years 1912, 1914, 1916, 1917, 1919, it produced an average of about 2 tons 1,700 pounds of hay per acre, as compared with about 2 tons of timothy during the same period.

Experiments with Western Rye grass were started in 1910, but records of its performance are available only since 1914. During 1914, 1916, 1917, 1919, it yielded at an average of about 3 tons 100 pounds per acre, as compared with an average of about 2 tons 1,875 pounds of brome grass and 2 tons 225 pounds of timothy.

Of the three grasses mentioned, the western rye and the brome grass are likely to give the best satisfaction, according to evidence obtained so far. Timothy, in accordance with experience, is apt to produce lower yields and cannot, therefore, at present at least, be recommended in preference to either brome or western rye.

MEADOW FESCUE

Experiments with this grass were first undertaken in 1912 but, for various reasons, hay crops were not realized until 1917. The few records which are available indicate, however, that Meadow Fescue may eventually prove to be a more valuable grass than timothy for the Fort Vermilion district. It is certainly worthy of further trials, particularly as it is an excellent grass for dairy cows, growing fast in the spring and being ready to cut at the same time as red clover. For the latter reason it lends itself better to being grown in mixture with red clover than with either timothy or western rye, both of which are somewhat later.

ANNUAL HAY

A few annual grasses, including Canary grass and four varieties of Millet have been tried, the latter for two years, the former for ten years beginning 1911. In the case of the millets, the 1921 yields were as follows: Common, 3 tons 120 pounds; Japanese, 3 tons 30 pounds; Hungarian, 2 tons 1,550 pounds; Siberian, 2 tons 1,370 pounds per acre. The data so far secured are, however, too meagre to allow any definite conclusion as to the value of millets in this district. The Canary grass has produced, every year, over 2 tons of hay per acre, and sometimes even twice as much, but the

quality of the hay is, on the whole, rather questionable. Especially in favourable years, when the crop grows rank and tall, the hay becomes coarse, rough, and unattractive.

During 1921 a number of cereals were sown for hay and yields, weighed green, obtained of from 5 tons 80 pounds to 5 tons 1,700 pounds per acre, a mixture of spring rye and Arthur peas giving the best results. Additional experiments will, however, have to be undertaken before conclusions as to the most valuable mixture of cereals for hay can be definitely made.

Fall Rye has been tried only once. It was sown in the fall of 1914, and the following year it produced a yield of over three tons of hay to the acre, attaining a height of about 4½ feet. It is worthy of further trials.

RAPE

Rape has been experimented with since 1915. It produces a very satisfactory growth and has considerable value especially because it furnishes a very welcome and appreciated addition to the hog ration.

WEATHER RECORDS

TABLE OF METEOROLOGICAL OBSERVATIONS taken at Fort Vermilion, Peace River District, Alta., from July 1, 1908, to March 31, 1909, showing maximum, minimum and mean temperature, also highest and lowest for each month with date of occurrence, also rainfall, snowfall and total precipitation.

Month	Maximum.	Minimum.	Mean.	Highest.	Date.	Lowest.	Date.	Rainfall.	Snowfall.	Total Precipitation.	Number of Days Precipitation.	Heaviest in 24 hours.	Date.
	°	°	°	°	°	°		In.	In.	In.		In.	
July.....	74.72	46.65	60.68	92.0	23rd	38.0	4th	2.30	.....	2.30	10	1.00	25th
August.....	71.19	43.35	57.26	85.0	5th	33.0	17th	2.05	.....	2.05	11	0.73	15th
September.....	56.97	33.68	45.32	73.9	12th	20.0	25th & 26th	0.69	.....	0.69	10	0.14	2nd
October.....	42.03	20.48	31.25	59.0	11th	-15.0	30th	0.33	2.00	0.55	7	0.15	4th
November.....	18.25	-1.10	8.45	41.0	6th	-43.5	30th	.....	8.50	0.85	6	0.40	28th
December.....	1.75	-17.75	-7.90	43.0	11th	-51.0	29th	.....	2.50	0.25	4	0.15	13th
January.....	-13.50	-36.67	-25.08	14.4	1st	-59.0	13th	.....	5.75	0.57	7	0.20	22nd
February.....	-4.10	-26.50	-15.32	18.2	19th	-59.5	7th	.....	1.50	0.15	5	0.05	2nd
March.....	25.17	4.07	14.47	43.4	25th	-26.0	8th	.....	4.25	0.42	6	0.20	5th
.....	.....	.....	.....	.....	.....	.....	.....	5.37	24.50	7.83	66	.....	.....

No records of temperature or precipitation have been supplied for April, May and June, 1908.

RECORD OF SUNSHINE AT FORT VERMILION, Peace River District, Alberta, from May 1, 1908, to March 31, 1909.

Month	Number of days with Sunshine	Number of days without Sunshine	Total hours Sunshine	Average Sunshine per day
*May.....	18	1	164.6	8.66
June.....	28	2	209.2	6.97
July.....	30	1	301.0	9.70
August.....	29	2	238.1	7.68
September.....	26	4	160.6	5.35
October.....	22	9	127.6	4.11
November.....	18	12	61.5	2.05
December.....	20	11	68.5	2.20
January.....	22	9	86.7	2.79
February.....	28	0	115.2	4.11
March.....	27	4	163.0	5.25

No returns for April, 1908, and during May a record of the first 19 days only was kept, owing to supply of cards for Sunshine Recorders having run out.

WEATHER RECORDS, APRIL 1, 1909, TO MARCH 31, 1910

Month	Maximum	Minimum	Range	Mean	Highest	Date	Lowest	Date	Rainfall	Snowfall	Total Precipitation	Number of days precipitation	Heaviest in 24 hours	Date
	°	°	°	°	°		°		In.	In.	In.		In.	
April.....	31.72	6.06	25.66	18.89	48.7	9th	-28.2	12th	0.38	1.00	0.72	4	0.38	9th
May.....	58.49	34.93	23.55	46.70	83.4	27th	14.7	1st	2.11	.....	2.11	10	0.71	21st
June.....	72.59	42.64	29.95	57.61	97.7	14th	30.2	1st	1.27	.....	1.27	5	0.92	17th
July.....	73.66	48.40	25.26	61.03	81.5	6th	34.4	1st	2.96	.....	2.96	9	0.98	5th
August.....	68.30	42.83	25.47	55.56	84.0	13th	30.2	18th	1.80	.....	1.80	9	0.60	20th
September.....	60.29	37.28	23.00	48.78	75.0	25th	22.0	22nd	1.30	.....	1.30	7	0.50	8th
October.....	41.46	27.15	14.30	34.30	64.0	4th	11.8	11th	0.31	0.25	0.33	5	0.17	17th
November.....	11.73	-9.13	20.86	1.30	45.0	3rd & 5th	-35.0	20th	.....	1.75	0.17	4	0.05	9th
December.....	7.83	-17.06	24.90	-4.61	37.0	16th	-46.0	2nd	.....	0.50	0.05	1	0.05	12th
January.....	10.37	-15.42	25.80	-2.52	34.2	31st	-32.0	17th	.....	2.50	0.24	4	0.07	14th & 30th
February.....	9.05	-24.93	33.98	-7.94	38.2	7th	-43.2	23rd	.....	1.25	0.12	2	0.10	26th
March.....	31.88	2.70	29.18	17.29	61.5	15th	-39.9	6th	.....	5.00	0.50	5	0.20	23th
									10.13	12.25	11.57	65	.....	.....

SUNSHINE RECORDS, APRIL 1, 1909, TO MARCH 31, 1910

Month	Number of days with Sunshine	Number of days without Sunshine	Total hours Sunshine	Average Sunshine per day
April.....	30	0	245.6	8.18
May.....	31	0	257.1	8.29
June.....	28	2	333.3	11.11
July.....	29	2	313.7	10.11
August.....	30	1	276.6	8.92
September.....	25	5	188.7	6.29
October.....	24	7	109.2	3.52
November.....	21	9	80.6	2.68
December.....	25	6	96.1	3.10
January.....	15	16	51.0	1.64
February.....	26	2	157.2	5.61
March.....	26	5	144.2	4.65

WEATHER RECORDS, APRIL 1, 1910, TO MARCH 31, 1911

Month	Maximum	Minimum	Range	Mean	Highest	Date	Lowest	Date	Rainfall	Snowfall	Total Precipitation	Number of days precipitation	Heaviest in 24 hours	Date
	°	°	°	°	°		°		In.	In.	In.		In.	
April.....	46.02	25.35	20.67	35.68	62.9	29th	16.0	6th	.....	3.25	0.32	2	0.30	20th
May.....	61.12	33.06	27.74	46.93	79.2	6th	19.5	15th	0.39	.....	0.39	3	0.31	29th
June.....	70.21	42.00	28.20	56.10	89.5	12th	29.0	3rd	1.73	.....	1.73	6	1.09	18th
July.....	72.63	47.35	25.27	59.98	81.1	13th	38.0	30th	2.33	.....	2.33	11	0.90	2nd
August.....	67.77	39.19	28.58	53.48	84.0	6th	24.8	26th	0.97	.....	0.97	5	0.40	28th
September.....	57.76	34.27	23.48	46.01	77.0	16th	20.1	24th	1.01	.....	1.01	9	0.25	21st
October.....	45.24	24.37	20.87	34.80	63.9	9th	7.5	27th	0.60	.....	0.60	5	0.19	9th
November.....	16.90	-5.38	22.26	5.75	33.9	16th	-26.2	7th	.....	7.75	0.77	4	0.35	11th
December.....	7.00	-17.31	24.31	-5.16	35.5	22nd	-52.9	29th	.....	8.50	0.85	6	0.30	8th
January.....	-18.80	-40.28	21.47	-29.55	3.2	5th	-78.0	11th	.....	9.75	0.97	8	0.30	6th
February.....	12.05	-20.05	32.10	-4.00	44.0	24th	-59.6	2nd	.....	2.00	0.20	3	0.10	9th
March.....	27.67	1.59	25.75	14.46	49.0	19th	-40.2	11th	.....	4.25	0.41	5	0.15	13th
									7.03	35.50	10.55	67	.....	.....

SUNSHINE RECORDS, APRIL 1, 1910, TO MARCH 31, 1912

Month	Number of days with Sunshine	Number of days without Sunshine	Total hours Sunshine	Average Sunshine per day
April.....	24	6	144.1	4.80
May.....	30	1	217.0	7.00
June.....	29	1	302.6	10.08
July.....	28	3	308.2	9.94
August.....	31	0	322.5	10.40
September.....	23	7	152.3	5.07
October.....	25	6	116.3	3.75
November.....	13	17	47.1	1.57
December.....	15	16	39.3	1.26
January.....	19	12	71.9	2.31
February.....	24	4	114.9	4.10
March.....	29	2	151.4	4.88

WEATHER RECORDS, APRIL 1, 1911, TO MARCH 31, 1912

Month	Maximum	Minimum	Range	Mean	Highest	Date	Lowest	Date	Rainfall	Snowfall	Total Precipitation	Number of days precipitation	Heaviest in 24 hours	Date
	°	°	°	°	°		°		In.	In.	In.		In.	
April.....	40.23	11.11	29.12	25.67	69.0	22nd	-26.0	4th	0.78	6.00	1.38	3	0.64	25th
May.....	63.23	33.92	29.31	48.57	82.2	17th	19.0	23rd	0.41	.....	0.41	3	0.36	6th
June.....	68.15	40.98	27.17	54.56	87.0	13th	29.0	4th	2.70	.....	2.70	9	1.43	19th
July.....	73.23	44.97	28.26	59.10	90.3	25th	32.2	20th	1.62	.....	1.62	8	0.79	3rd
August.....	66.99	39.88	27.10	53.43	77.5	1st	31.5	8th & 31st	1.85	.....	1.85	8	1.24	11th
September.....	58.23	28.86	29.36	43.54	76.0	16th	8.0	23rd	1.32	.....	1.32	7	0.35	14th
October.....	49.50	23.37	26.12	36.43	76.9	9th	-3.5	31st	0.19	.....	0.19	3	0.09	16th
November.....	21.16	-11.66	32.82	4.75	53.0	3rd	-33.5	15th	.....	4.00	0.40	3	0.20	20th
December.....	10.83	-14.56	25.40	-1.86	35.5	16th	-58.5	28th	.....	3.00	0.30	1	0.30	23rd
January.....	0.06	-23.15	23.22	-11.54	26.9	26th	-58.0	5th	.....	2.00	0.20	4	0.07	7th
February.....	15.35	-12.22	27.57	1.56	35.0	23rd	-48.0	28th	.....	3.25	0.32	6	0.10	14th
March.....	30.09	-8.94	39.03	10.57	54.5	26th	-38.0	1st	.....	0.50	0.05	2	0.02	24th
									8.87	18.75	10.74	57	.....	.....

SUNSHINE RECORDS, APRIL 1, 1911, TO MARCH 31, 1912

Month	Number of days with Sunshine	Number of days without Sunshine	Total hours Sunshine	Average Sunshine per day
April.....	27	3	175.3	5.84
May.....	28	3	233.9	7.54
June.....	27	3	217.6	7.25
July.....	30	1	264.0	8.51
August.....	28	3	214.1	6.90
September.....	27	3	165.7	5.52
October.....	28	3	141.2	4.55
November.....	21	9	88.2	2.94
December.....	16	15	53.2	1.71
January.....	17	14	51.4	1.65
February.....	17	12	88.3	3.04
March.....	30	1	197.7	6.37

WEATHER RECORDS, APRIL 1, 1912, TO MARCH 31, 1913

Month	Maximum	Minimum	Range	Mean	Highest	Date	Lowest	Date	Rainfall	Snowfall	Total Precipitation	Number of days precipitation	Heaviest in 24 hours	Date
	°	°	"	°	°		"		In.	In.	In.		In.	
April.....	48-28	21-19	27-09	34-73	64-0	16th	9-9	14th	0-40	0-75	0-47	2	0-40	20th
May.....	69-61	33-53	36-08	51-57	103-0	15th	22-0	10th & 19th	0-57	.....	0-57	3	0-46	28th
June.....	75-75	42-66	33-09	59-20	98-0	22nd	29-0	2nd & 30th	0-17	.....	0-17	4	0-06	27th
July.....	71-68	40-98	30-70	56-33	86-5	31st	25-0	14th	1-37	.....	1-37	9	0-41	20th
August.....	71-60	43-10	28-50	57-35	98-0	17th	23-5	28th	1-80	.....	1-80	11	0-94	9th
September...	64-83	27-51	37-32	46-17	80-5	16th	5-0	23rd	0-26	.....	0-26	3	0-11	18th
October.....	46-24	22-48	23-76	34-36	66-0	16th	9-5	19th	0-76	2-00	0-96	5	0-40	1st
November...	25-83	7-03	18-79	16-42	41-0	15th	15-9	30th	0-18	2-25	0-40	5	0-12	29th
December...	9-26	-14-72	23-99	-2-73	46-0	9th	43-5	1st	.....	2-50	0-24	4	0-10	6th
January.....	-10-78	-33-72	22-94	-22-25	18-3	28th	64-5	20th	.....	3-25	0-32	6	0-10	26th
February....	11-63	-16-62	28-25	-2-50	34-9	20th & 21st	47-0	25th	.....	4-00	0-39	4	0-30	13th
March.....	20-41	-13-35	33-76	3-53	53-5	28th	40-5	18th	.....	3-25	0-32	2	0-30	3rd
	.....	.....	.....	.....	.....	.....	.....	.....	5-51	18-00	7-27	58	.....	.....

SUNSHINE RECORDS, APRIL 1, 1912, TO MARCH 31, 1913

Month	Number of days with Sunshine	Number of days without Sunshine	Total hours Sunshine	Average Sunshine per day
April.....	25	5	170-1	5-67
May.....	29	2	288-8	9-31
June.....	26	4	288-6	9-62
July.....	27	4	239-5	7-72
August.....	23	8	194-5	6-27
September...	29	1	239-6	7-98
October.....	16	15	104-5	3-37
November...	14	16	53-9	1-79
December...	18	13	62-8	2-02
January.....	19	12	78-5	2-53
February....	23	5	120-4	4-30
March.....	30	1	218-4	7-04

WEATHER RECORDS, APRIL 1, 1913, TO MARCH 31, 1914

Month	Maximum	Minimum	Range	Mean	Highest	Date	Lowest	Date	Rainfall	Snowfall	Total Precipitation	Number of days precipitation	Heaviest in 24 hours	Date
	°	°	°	°	°		°		In.	In.	In.		In.	
April.....	48-88	21-14	27-74	35-01	78-0	20th	1-5	8th	0-38	3-00	0-68	3	0-34	22nd
May.....	59-72	31-55	28-16	45-63	74-0	26th	14-5	7th	0-91	.....	0-91	5	0-45	9th
June.....	73-13	38-54	34-59	55-83	88-5	4th	26-0	2nd	0-98	.....	0-98	3	0-86	14th
July.....	74-56	43-55	31-00	59-05	84-0	23rd	32-9	25th & 28th	1-57	.....	1-57	7	0-64	13th
August.....	72-07	44-93	27-14	58-50	84-8	6th	28-2	30th	1-81	.....	1-81	4	1-00	31st
September...	53-75	31-89	21-86	42-82	69-0	27th	23-9	11th	3-08	.....	3-08	9	1-07	1st
October.....	38-73	19-10	19-62	28-91	69-6	2nd	-2-5	28th	0-72	0-50	0-77	6	0-30	20th
November...	25-72	3-36	22-36	14-54	46-0	5th	-19-5	22nd	0-17	1-50	0-32	3	0-17	15th
December...	19-16	-4-38	23-55	7-39	65-0	4th	-39-0	24th	.....	4-25	0-42	5	0-20	20th
January.....	-1-58	-20-41	18-83	-11-00	12-5	14th	-54-0	29th	.....	7-00	0-70	4	0-40	18th
February....	-2-07	-26-46	24-38	-14-17	16-2	25th	56-5	2nd	.....	4-75	0-47	3	0-30	27th
March.....	23-70	-10-47	37-40	-8-23	40-0	10th	40-5	25th	.....	7-00	0-70	3	0-50	31st
	.....	.....	.....	.....	.....	.....	.....	.....	9-62	28-00	12-41	55	.....	.....

SUNSHINE RECORDS, APRIL 1, 1913, TO MARCH 31, 1914

Month	Number of days with Sunshine	Number of days without Sunshine	Total hours Sunshine	Average Sunshine per day
April.....	26	4	206.3	6.87
May.....	30	1	242.1	7.80
June.....	29	1	351.9	11.73
July.....	28	3	294.7	9.50
August.....	26	5	252.9	8.15
September.....	19	11	142.7	4.75
October.....	24	7	89.9	2.90
November.....	18	12	67.0	2.23
December.....	17	14	42.7	1.37
January.....	15	16	71.7	2.31
February.....	19	9	94.7	3.38
March.....	27	4	188.7	6.08

WEATHER RECORDS, APRIL 1, 1914 TO MARCH 31, 1915

Month	Maximum	Minimum	Range	Mean	Highest	Date	Lowest	Date	Rainfall	Snowfall	Total Precipitation	Number of days precipitation	Heaviest in 24 hours	Date
	°	°	°	°	°		°		In.	In.	In.		In.	
April.....	46.22	16.73	29.49	31.47	61.1	29th	-14.0	2nd	0.08	.....	0.08	1	0.08	28th
May.....	63.81	32.64	31.17	48.22	82.9	24th	20.9	4th	0.16	.....	0.16	4	0.06	17th
June.....	72.11	41.70	30.41	56.90	90.0	15th	29.0	10th	0.66	.....	0.66	6	0.34	5th
July.....	74.03	45.62	28.40	59.82	90.2	1st	35.2	30th	1.74	.....	1.74	10	0.48	21st
August.....	72.42	43.13	29.28	57.77	84.0	4th	31.2	23rd	1.80	.....	1.80	7	0.90	7th
September.....	58.16	33.00	25.16	45.58	76.0	3rd	23.1	17th	0.79	.....	0.79	6	0.20	4th
October.....	47.59	24.56	23.02	36.07	67.9	8th	15.2	11th	0.25	.....	0.25	3	0.11	30th
November.....	23.51	3.58	19.93	13.54	43.5	20th	-25.0	17th	.....	8.00	0.80	5	0.30	11th
December.....	-0.43	-25.84	25.40	-13.14	28.0	17th	-43.5	28th	.....	0.50	0.05	1	0.05	21st
January.....	3.24	-21.83	25.08	-9.29	32.5	18th	-53.0	26th	.....	2.50	0.25	4	0.10	12th
February.....	15.73	-15.33	31.08	0.20	27.5	23rd	-43.0	18th	.....	3.50	0.35	2	0.30	16th
March.....	33.21	1.25	31.96	17.23	55.0	22nd	-22.5	1st	.....	8.00	0.80	6	0.25	3rd
								.....	5.48	22.50	7.73	55	.....	.....

SUNSHINE RECORDS, APRIL 1, 1914, TO MARCH 31, 1915

Month	Number of days with Sunshine	Number of days without Sunshine	Total hours Sunshine	Average Sunshine per day
April.....	30	0	255.2	8.50
May.....	31	0	392.3	12.65
June.....	28	2	287.8	9.59
July.....	28	3	335.4	10.81
August.....	28	3	297.1	9.58
September.....	23	7	163.7	5.45
October.....	18	13	128.2	4.13
November.....	13	17	43.9	1.46
December.....	18	13	60.1	1.93
January.....	23	8	63.9	2.06
February.....	24	4	114.7	4.09
March.....	25	6	166.7	5.37

WEATHER RECORDS, APRIL 1, 1915, TO MARCH 31, 1916

Month	Maximum	Minimum	Range	Mean	Highest	Date	Lowest	Date	Rainfall	Snowfall	Total Precipitation	Number of days precipitation	Heaviest in 24 hours	Date
	°	°	°	"	°		°		In.	In.	In.		In.	
April.....	58.91	27.32	31.59	43.11	69.0	13th	15.9	1st	1.20	.....	1.20	5	0.51	8th
May.....	62.33	34.55	27.78	48.44	77.0	26th	24.0	13th	2.19	.....	2.19	5	1.81	29th
June.....	68.66	36.41	32.24	52.53	82.5	26th	17.9	15th	1.08	.....	1.08	3	0.81	3rd
July.....	74.73	43.64	31.09	59.18	84.5	7th	31.5	3rd	1.60	.....	1.60	8	0.56	22nd
August.....	78.77	44.60	34.17	61.68	92.0	12th	37.0	25th	1.16	.....	1.16	5	0.74	31st
September.....	57.07	29.00	28.07	43.03	78.0	4th	14.9	18th	0.38	.....	0.38	4	0.17	22nd
October.....	41.04	18.42	22.61	29.72	70.5	17th	-0.0	30th	0.55	7.50	1.30	6	0.50	5th
November.....	16.90	-7.49	24.26	4.64	34.0	5th	-28.0	9th & 21st	.....	3.75	0.37	3	0.17	16th
December.....	11.01	-13.57	24.61	-1.27	34.0	4th	-38.0	16th	.....	8.25	0.82	5	0.50	9th
January.....	-11.45	-36.25	24.79	-23.86	21.0	17th	-65.0	10th	.....	9.00	0.90	7	0.30	21st
February.....	13.55	-15.80	29.70	-0.95	41.0	25th	-57.0	10th	.....	0.25	0.02	1	0.02	22nd
March.....	13.27	-13.73	27.01	-0.23	50.5	28th	-38.0	3rd & 7th	.....	12.50	1.23	9	0.47	28th
									8.16	41.25	12.25	61		

SUNSHINE RECORDS, APRIL 1, 1915, TO MARCH 31, 1916

Month	Number of days with Sunshine	Number of days without Sunshine	Total hours Sunshine	Average Sunshine per day
April.....	28	2	222.9	7.43
May.....	25	6	254.0	8.19
June.....	30	0	357.2	11.90
July.....	28	3	326.7	10.53
August.....	28	3	305.0	9.83
September.....	27	3	173.0	5.76
October.....	20	11	97.5	3.14
November.....	22	8	89.7	2.99
December.....	17	14	60.5	1.95
January.....	20	11	83.4	2.69
February.....	27	2	161.2	5.55
March.....	23	8	156.5	5.04

WEATHER RECORDS, APRIL 1, 1916, TO MARCH 31, 1917

Month	Maximum	Minimum	Range	Mean	Highest	Date	Lowest	Date	Rainfall	Snowfall	Total Precipitation	Number of days precipitation	Heaviest in 24 hours	Date
	°	°	°	°	°		°		In.	In.	In.		In.	
April.....	48.37	19.58	28.79	33.97	60.0	26th	-3.0	3rd	.....	.....	.....	.....	.....	.....
May.....	61.09	31.56	29.53	46.32	79.5	19th	22.0	2nd	1.90	.....	1.90	5	1.25	7th
June.....	71.66	40.75	30.91	56.20	84.0	29th	28.9	5th	1.98	.....	1.98	9	1.25	4th
July.....	71.20	43.66	27.53	57.42	87.5	1st	33.2	24th	4.04	.....	4.04	13	1.50	14th
August.....	69.51	37.70	31.81	53.60	82.9	13th	24.0	31st	0.42	.....	0.42	4	0.19	7th
September.....	60.50	31.87	28.63	46.18	77.5	18th	22.9	23rd	1.56	.....	1.56	5	1.05	10th
October.....	45.04	20.85	22.19	31.94	66.0	10th	8.9	31st	0.83	1.50	0.98	4	0.75	13th
November.....	23.61	-1.62	25.23	10.99	47.9	17th	-23.0	12th	.....	2.75	0.27	4	0.10	2nd
December.....	-3.24	-26.00	22.76	-14.62	18.9	4th	-55.0	11th	.....	8.00	0.79	5	0.25	11th
January.....	-4.80	-30.64	26.16	-17.56	4.20	8th	-60.0	31st	.....	4.50	0.44	7	0.10	10th
February.....	1.23	-24.97	26.20	-11.87	29.5	15th	-71.0	1st	.....	2.00	0.20	2	0.15	15th
March.....	25.48	-11.64	37.13	6.92	41.9	28th	39.0	2nd	.....	16.50	1.65	3	0.80	30th
									10.73	35.25	14.23	61		

SUNSHINE RECORDS, APRIL 1, 1916, TO MARCH 31, 1917

Month	Number of days with Sunshine	Number of days without Sunshine	Total hours Sunshine	Average Sunshine per day
April.....	28	2	247.0	8.23
May.....	29	2	275.7	8.89
June.....	29	1	367.9	12.26
July.....	29	2	230.3	9.04
August.....	31	0	318.9	10.28
September.....	25	5	195.9	6.53
October.....	20	11	111.9	3.60
November.....	18	12	62.9	2.09
December.....	16	15	56.9	1.83
January.....	22	9	89.5	2.88
February.....	21	7	108.6	3.87
March.....	27	4	166.0	5.35

WEATHER RECORDS, APRIL 1, 1917, TO MARCH 31, 1918

Month	Maximum	Minimum	Range	Mean	Highest	Date	Lowest	Date	Rainfall	Snowfall	Total Precipitation	Number of days of precipitation	Heaviest in 24 hours	Date
	°	°	°	°	°		°		In.	In.	In.		In.	
April.....	42.25	10.89	31.36	26.57	57.9	14th	-21.0	1st	0.50	.....	0.50	1	0.50	8th
May.....	58.98	29.31	29.66	44.14	80.2	10th	11.0	2nd	0.41	.....	0.41	2	0.25	15th
June.....	64.96	35.88	29.07	50.41	78.0	26th	19.9	1st	1.84	.....	1.84	5	1.12	3rd
July.....	74.15	43.21	30.93	58.67	88.5	4th	33.2	9th	2.15	.....	2.15	7	0.92	30th
August.....	70.48	39.59	30.88	55.03	82.0	12th	28.5	27th	1.33	.....	1.33	10	0.76	2nd
September.....	64.24	25.99	38.25	45.11	84.0	22nd	13.9	26th	0.14	.....	0.14	2	0.10	6th
October.....	40.28	16.68	23.59	28.47	62.0	9th	-12.0	28th	0.82	2.00	1.01	7	0.40	2nd
November.....	35.28	9.27	26.01	22.27	60.0	3rd	-14.9	30th	.....	1.50	0.15	1	0.15	25th
December.....	-19.26	-37.49	18.22	-28.38	-4.0	5th	-64.0	27th	.....	6.75	0.66	6	0.15	1st & 31st
January.....	-3.50	-26.64	23.14	-15.07	13.0	7th	-65.0	25th & 29th	.....	11.25	1.12	8	0.27	23rd
February.....	1.21	-26.6	27.12	-12.70	41.0	23rd	-65.8	19th	.....	7.25	0.71	8	0.15	9th
March.....	16.92	-16.6	33.08	0.38	44.0	31st	-48.0	4th	.....	4.25	0.42	5	0.15	7th
.....	.....	.....	.....	.....	.....	.....	.....	.....	7.19	33.00	10.44	62	.....	.....

SUNSHINE RECORDS, APRIL 1, 1917, TO MARCH 31, 1918

Month	Number of days with Sunshine	Number of days without Sunshine	Total hours Sunshine	Average Sunshine per day
April.....	28	2	286.6	9.55
May.....	30	1	296.3	9.55
June.....	26	4	280.9	9.36
July.....	29	2	297.7	9.60
August.....	30	1	305.9	9.86
September.....	30	0	244.8	8.16
October.....	23	8	128.1	4.13
November.....	22	8	81.4	2.71
December.....	20	11	80.8	2.60
January.....	16	15	72.0	2.32
February.....	18	10	94.8	3.38
March.....	28	3	166.1	5.35

WEATHER RECORDS, APRIL 1, 1918 TO MARCH 31, 1919

Month	Maximum	Minimum	Range	Mean	Highest	Date	Lowest	Date	Rainfall	Snowfall	Total Precipitation	Number of days precipitation	Heaviest in 24 hours	Date
	°	°	°	°	°		°		In.	In.	In.		In.	
April.....	44.80	12.95	31.85	28.87	58.9	30th	-11.5	7th	.....	0.50	0.05	1	0.05	5th
May.....	52.85	26.49	26.36	39.67	69.0	29th	11.5	16th	0.20	3.00	1.27	7	0.56	1st
June.....	67.82	36.39	31.43	52.10	81.9	18th	16.0	2nd	1.21	.....	1.21	7	0.37	11th
July.....	70.76	37.80	33.95	54.77	88.9	17th	20.0	24th	1.26	.....	1.26	7	0.38	5th
August.....	69.69	39.88	29.80	54.78	83.9	16th	33.0	25th	2.77	.....	2.77	15	1.45	17th
September.....	65.38	27.76	37.62	46.57	79.0	5th	14.0	8th	0.02	.....	0.02	1	0.02	7th
October.....	41.41	13.28	28.13	27.34	66.0	4th	-15.5	30th	0.08	14.75	1.55	5	1.00	20th
November.....	22.98	-3.31	19.67	6.52	45.5	1st	-23.5	16th	.....	7.50	0.75	5	0.40	29th
December.....	10.76	-17.52	28.29	-3.38	37.0	25th	-40.0	14th	.....	1.25	0.12	2	0.10	11th
January.....	13.85	-16.21	30.38	-1.02	47.9	9th	-38.0	20th	.....	1.50	0.15	3	0.05	18th
February.....	4.36	-26.27	30.63	-10.96	26.5	13th & 20th	-64.5	25th	.....	2.25	0.22	2	0.20	17th
March.....	13.28	-24.85	37.13	-6.29	46.5	22nd	-48.9	13th	.....	1.00	0.09	3	0.05	14th
	.....	.....	.....	.....	.....	.....	.....	.....	5.54	31.75	9.46	58	.....	.....

SUNSHINE RECORDS, APRIL 1, 1918, TO MARCH 31, 1919

Month	Number of days with Sunshine	Number of days without Sunshine	Total hours Sunshine	Average Sunshine per day
April.....	28	2	236.0	7.86
May.....	28	3	226.3	7.30
June.....	29	1	263.8	8.78
July.....	30	1	320.0	10.32
August.....	29	2	249.0	8.93
September.....	30	0	285.6	9.52
October.....	21	10	136.0	4.38
November.....	20	10	66.7	2.22
December.....	15	16	42.6	1.37
January.....	15	16	56.2	1.81
February.....	22	6	119.1	4.25
March.....	30	1	194.0	6.25

WEATHER RECORDS, APRIL 1, 1919, TO MARCH 31, 1920

Month	Maximum	Minimum	Range	Mean	Highest	Date	Lowest	Date	Rainfall	Snowfall	Total Precipitation	Number of days precipitation	Heaviest in 24 hours	Date
	°	°	°	°	°		°		In.	In.	In.		In.	
April.....	49.63	18.63	31.00	34.13	69.9	27th	10.2	22nd	0.69	3.00	0.99	2	0.69	20th
May.....	57.82	27.89	29.93	42.85	76.0	19th	13.5	5th	0.74	3.25	1.06	7	0.39	29th
June.....	63.44	36.26	27.18	49.85	89.2	15th	20.0	1st	6.76	.....	6.76	11	1.30	6th
July.....	73.06	44.23	28.82	58.64	89.0	16th	34.0	3rd	1.92	.....	1.92	9	0.63	6th
August.....	70.77	41.98	28.79	56.37	82.5	13th	28.5	25th & 31st	2.79	.....	2.79	13	1.74	5th
September.....	63.93	28.93	35.00	46.43	82.0	18th	14.0	28th	0.81	.....	0.81	3	0.56	25th
October.....	32.51	4.77	27.73	18.63	58.9	4th	-22.0	26th	0.62	6.00	1.26	7	0.40	7th
November.....	13.55	-13.89	27.44	-0.17	42.0	21st	-46.9	30th	.....	5.25	0.52	3	0.40	9th
December.....	4.32	-22.36	26.65	-9.04	49.0	19th	-50.0	15th	.....	1.75	0.17	2	0.12	16th
January.....	-3.80	-31.77	27.97	-17.79	26.0	6th	-58.9	24th	.....	2.50	0.25	1	0.25	15th
February.....	23.46	-11.20	34.66	6.13	46.0	18th	-41.0	2nd	.....	1.50	0.15	3	0.05	9th
March.....	23.50	-12.89	36.40	5.31	42.5	13th	-47.0	2nd	.....	1.50	0.15	3	0.05	20th
	.....	.....	.....	.....	.....	.....	.....	.....	14.33	24.75	16.83	64	.....	.....

SUNSHINE RECORDS, APRIL 1, 1919, TO MARCH 31, 1920

Month	Number of days with Sunshine	Number of days without Sunshine	Total hours Sunshine	Average Sunshine per day
April.....	27	3	186.9	6.23
May.....	23	8	174.2	5.61
June.....	21	9	206.9	6.89
July.....	28	3	279.8	9.02
August.....	29	2	255.0	8.22
September.....	28	2	225.6	7.52
October.....	19	12	97.3	3.13
November.....	18	12	73.9	2.46
December.....	21	10	59.4	1.91
January.....	22	9	84.3	2.71
February.....	25	4	121.6	4.19
March.....	25	6	166.0	5.35

WEATHER RECORDS, APRIL 1, 1920, to MARCH 31, 1921

Month	Maximum	Minimum	Range	Mean	Highest	Date	Lowest	Date	Rainfall	Snowfall	Total Precipitation	Number of days precipitation	Heaviest in 24 hours	Date
	°	°	°	°	°		°		In.	In.	In.		In.	
April.....	36.85	5.07	31.77	20.95	54.9	18th	-38.0	2nd & 4th	.....	1.00	0.10	1	0.10	20th
May.....	55.85	27.35	28.49	41.59	79.0	8th	5.9	1st	1.17	.....	1.17	6	0.66	18th
June.....	65.19	33.60	31.58	49.39	78.0	30th	1.70	7th	2.50	.....	2.50	9	0.72	25th
July.....	78.50	43.06	35.44	60.78	91.0	9th	30.0	11th	1.15	.....	1.15	6	0.41	18th
August.....	71.12	38.76	32.36	54.94	88.5	7th	27.5	18th	2.28	.....	2.28	4	1.09	25th
September.....	57.06	28.90	28.15	42.97	77.0	2nd	15.0	28th	2.29	2.50	2.54	12	1.02	25th
October.....	42.72	15.61	27.15	29.18	68.9	1st	3.0	20th	0.51	6.25	1.13	6	0.35	7th
November.....	24.82	-0.51	24.94	12.98	48.0	4th	-29.5	25th	.....	1.25	0.12	3	0.05	22nd
December.....	3.04	-20.85	24.54	-8.58	24.5	4th	-48.9	26th	.....	5.00	0.49	6	0.30	27th
January.....	-0.30	-30.22	29.92	-15.26	24.0	22nd	-54.5	17th	.....	8.00	0.80	6	0.22	2nd
February.....	11.98	-21.25	33.23	-4.64	48.9	27th	-53.5	19th	.....	7.75	0.77	6	0.20	2nd
March.....	17.96	-19.35	37.25	-0.73	47.9	31st	-45.0	13th	.....	0.50	0.05	1	0.05	1st
									9.90	32.25	13.10	66		

SUNSHINE RECORDS, APRIL 1, 1920, TO MARCH 31, 1921

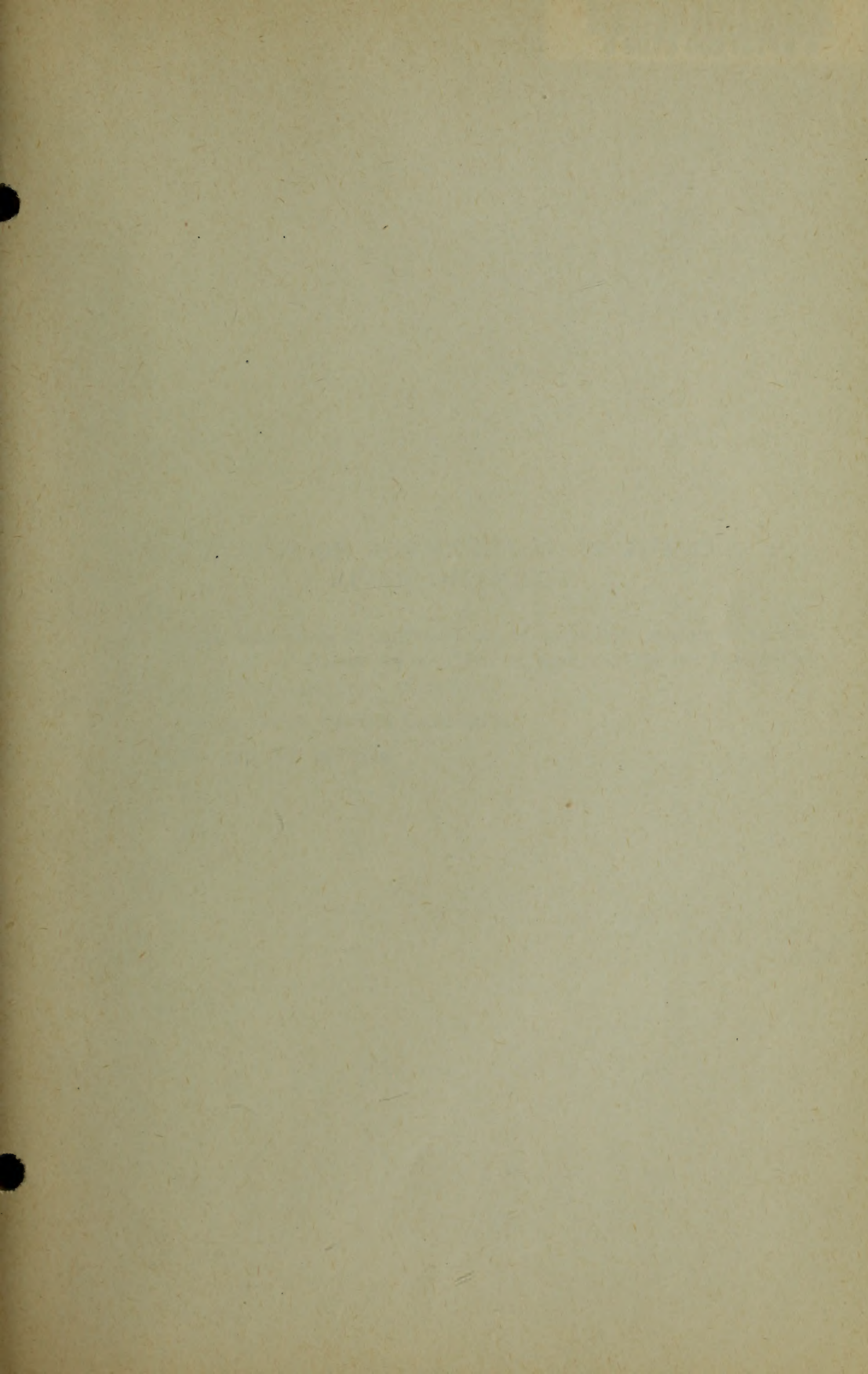
Month	Number of days with Sunshine	Number of days without Sunshine	Total hours Sunshine	Average Sunshine per day
April.....	24	6	193.5	6.45
May.....	24	7	193.1	6.22
June.....	26	4	229.1	7.63
July.....	31	0	325.8	10.50
August.....	28	3	286.1	9.22
September.....	20	10	143.5	4.78
October.....			113.8	3.67
November.....	20	10	74.1	2.47
December.....	9	22	32.9	1.06
January.....	20	11	79.1	2.55
February.....	19	9	98.5	3.51
March.....	26	5	16.99	5.48

WEATHER RECORDS, APRIL 1, 1921, TO DECEMBER 31, 1921

Month	Maximum	Minimum	Range	Mean	Highest	Date	Lowest	Date	Rainfall	Snowfall	Total Precipitation	Number of days of precipitation	Heaviest in 24 hours	Date
	°	°	°	°	°		°		In.	In.	In.		In.	
April.....	51.86	18.01	33.84	36.93	68.0	16th	-8.0	4th	0.51	3.90	0.90	2	0.81	24th
May.....	62.28	30.22	32.05	46.24	83.5	20th	17.2	28th	0.39	.....	0.39	4	0.18	4th
June.....	70.25	38.96	31.29	54.60	84.4	8th	17.9	2nd	3.46	.....	3.46	13	1.02	15th
July.....	74.60	47.31	27.28	60.95	85.5	16th	37.5	6th	2.10	.....	2.10	10	0.95	9th
August.....	65.89	43.18	22.70	54.53	80.5	14th	32.5	12th	3.63	.....	3.63	16	1.07	25th
September	60.13	32.39	27.74	46.26	74.5	16th	21.5	12th	1.47	.....	1.47	6	0.70	20th
October...	47.56	28.83	17.82	38.19	73.5	12th	19.0	10th	0.68	1.00	0.78	8	0.27	18th
November	13.65	-4.50	18.16	4.58	39.0	2nd	-33.0	22nd	.....	5.00	0.50	5	0.15	2nd & 4th
December.	13.40	-13.33	26.74	0.04	43.5	9th	-43.9	19th	.....	1.50	0.15	2	0.10	10th
.....	.....	.....	.....	.....	.....	.....	.....	.....	12.24	11.40	13.38	66	.....	.....

SUNSHINE RECORDS, APRIL 1, 1921, TO DECEMBER 31, 1921

Month	Number of days with Sunshine	Number of days without Sunshine	Total hours Sunshine	Average Sunshine per day
April.....	30	0	246.5	8.21
May.....	28	3	245.1	7.90
June.....	27	3	230.5	7.68
July.....	31	0	309.8	9.99
August.....	24	7	166.3	5.36
September.....	27	3	218.1	7.27
October.....	20	11	99.1	3.19
November.....	14	16	55.4	1.84
December.....	21	10	59.8	1.92





PUBLICATIONS ON AGRICULTURE IN THE PEACE RIVER DISTRICT

The following publications of the Department of Agriculture relating to *Agriculture in the Peace River District* are available on application to the Publications Branch, Department of Agriculture, Ottawa:—

Pamph. 29, Grande Prairie's Capabilities.

Reports 1908-1921 inclusive.

